IN PRACTICE

Texting decreases the time to treatment for genital *Chlamydia trachomatis* infection

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Objective: To assess the effectiveness of a text message result service within an inner London sexual health clinic.

Method: Demographic data, diagnoses, and time to diagnosis and treatment were collected over a 6 month period for patients receiving text messages and a matched standard recall group. Data on messages sent, staff time, and cost in relation to result provision were collected.

Results: Over a 6 month period 952 text messages were sent. In the final month of analysis, 33.9% of all clinic results were provided by text, resulting in a saving of 46 hours of staff time per month. 49 messages requested that the patient return for treatment, 28 of these patients had untreated genital *Chlamydia trachomatis* (CT) infection. The mean number of days (SD) to diagnosis was significantly shorter in the text message group (TG) v the standard recall group (SG) (7.9 (3.6) v 11.2 (4.7), p <0.001). The median time to treatment was 8.5 days (range 4–27 days) for the TG group v 15.0 (range 7–35) for SG, p = 0.005.

Conclusion: Patients with genital CT infection are diagnosed and receive treatment sooner since the introduction of a text message result service. The introduction of this service has resulted in a significant saving in staff time.

I n genitourinary medicine (GUM) clinics a significant proportion of staff time is taken up providing the results of sexual health screens. In a recent cross directorate survey we identified an average of 120 hours per month were required for this purpose.[1] In the majority of cases these results are negative.[2] Providing this service diverts staff time and resources from seeing new patients and managing patients with diagnosed infections, and increases the waiting time for an appointment and the time patients spend in clinic. It has been shown that extended waiting times adversely impact on first time attendance of young men.[3] In addition, reducing the time to treatment of sexually transmitted infections (STI) reduces complication rates and onward transmission. Mathematical modelling has shown the duration of infection is proportional to the average number of secondary cases of infection.[4] Decreasing the period of infectivity is therefore desirable both from an individual and a public health perspective.

Short messages service (text messaging) allows communication using alphanumeric messages to mobile phones. This form of communication is becoming increasingly popular and an estimated 500 billion text messages are sent per annum.[5] Text messaging is now being used in a wide variety of healthcare settings.[6–8] Survey returns from our patient group showed that 98% had a mobile phone while only 68% had a personal email address.[1] These results supported our clinic's decision to initiate a text message results service. Before the introduction of this service, patients had been asked to return in person or phone the clinic for their results. This paper describes the impact on result provision in the John Hunter Clinic (JHC) following a 6 month, stepwise introduction of a text message result service.

MATERIAL AND METHODS

Patients attending the JHC, who were assessed as being at low risk for HIV infection, were offered the text message results service. Recruitment was initially performed by two of the authors (ASM-J and AKS), and subsequently more team members were trained to offer the service. A specially designed card recorded the patient's mobile phone and clinic number, and the investigations performed. Patients were advised to contact the clinic if they had not received a result within 2 weeks. Using specific software (Mikkom Ltd, Windsor, UK) it is possible to send multiple messages from a personal computer simultaneously and track their delivery. No personal identifying information or diagnoses were sent within these messages, in accordance with Caldecott guidelines.

We identified patients with a diagnosis of untreated genital *Chlamydia trachomatis* infection (CT) who were sent a text message (TG) and compared them to patients with untreated CT recalled by standard methods (SG) over the study period, collecting demographic and attendance data (initial attendance, contact date, and subsequent re-attendance).

We collected data on all methods of result provision in the clinic over the study period; text messages, results phone line, and clinic re-attendances for results. The time to provide results via clinic re-attendance, results phone line, and text message was estimated to be 12 minutes, 4 minutes, and 1.5 minutes respectively. We calculated the cost for each method of result delivery using the midpoint of an F grade staff nurse pay scale of £13/hour. During the study period, change in clinic policy enabled patients at low risk of HIV infection to access all results by telephone. Additionally, rapid, near patient HIV testing was introduced for patients at increased risk of HIV acquisition, increasing the number of patients eligible for the texting service for the remainder of their results.

Statistics

Quantitative data were compared between two groups using unpaired *t* test where the distribution of data were geometric while hypergeometrically distributed data were analysed

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Abbreviations: CT, *Chlamydia trachomatis*; GUM, genitourinary medicine; SG, standard recall group; STI, sexually transmitted infections; TG, text message group

Table 1 The number and type of text messages sent and the time and cost for the results service

| Month, 2004 | Number of sexual health screens (=KC60 codes S1+S2) | Number of text messages (sent with JHC as message header) | | | Number of results and staff time required (number of results hours taken) | | | | Proportion of total results by text (%) | Cost of result service (£) |
		"All your results are negative"	"Please ring the clinic"	"Please come back to the clinic"	Text	Phone	In person	Total		
March	875	17	4	1	22 (0.3)	410 (27.3)	441 (88.2)	873 (115.8)	4	1505
April	774	100	14	9	123 (3.1)	293 (19.5)	302 (60.4)	718 (83)	17	1079
May	746	149	22	5	176 (4.0)	263 (17.5)	250 (50.0)	689 (71.5)	26	930
June	947	172	15	11	199 (4.8)	290 (19.3)	264 (52.8)	753 (76.9)	26	1000
July	987	125	13	10	147 (3.5)	410 (27.3)	235 (47.0)	792 (77.8)	19	1011
August	889	218	54	13	285 (6.5)	365 (24.3)	191 (38.2)	841 (69)	34	897
Total	5218	781	122	49	952 (23.8)	2031 (135.4)	1683 (336.6)	4666 (495.8)	20	6445
Predicted	889				799 (20.0)	45 (3.0)	45 (9.0)	889 (32)	90	416

using Mann-Whitney U test statistics. Qualitative data were assessed by groups using χ^2 test. All p values presented are two tailed.

RESULTS

Over a 6 month period, 952 text messages were sent, resulting in a decrease in the time spent on result provision and a subsequent cost saving (table 1). In the final month of analysis, 33.9% of all clinic results were provided by text, resulting in a saving of 46 hours of staff time and £609.10 per month (40.4% saving). Table 1 also indicates the predicted cost and time savings if 100% of patients receive their results, based on August attendance figures. In this analysis we assume that 90% of our patients would receive result via text message.

Twenty eight text messages were sent for patients with untreated CT (TG). Twenty one patients met the criteria for SG. The two groups were comparable by age, sex, and race. TG patients were diagnosed faster and received treatment sooner than SG patients (table 2). The number of patients declining the service when offered was not recorded but was low (F Boag, personal communication).

DISCUSSION

Patients with CT are diagnosed and receive treatment sooner following the introduction of a text message results service. It also made a significant impact on the time taken for overall result provision within our clinic. The time taken for patients to re-attend once contacted was the same for both groups. The main time advantage was made by a member of staff accessing results and efficiently communicating them to the patient. The average time to treatment in SG is comparable to a previous study in our clinic of men with CT, 15 days (range 7–35) v 18.8 days (range 3–83), respectively.[9]

In addition to the above benefits there are clinical governance issues addressed by the text message result service. All results are actively accessed and communicated to the patient, thereby decreasing the possibility of "missed results" and, in most cases, successfully closing the consultation. Sending the majority of patients a text message result would help us reach our target of 100% result provision. The introduction of the text message service has improved the options available to our patients when choosing how they wish to receive their results. In view of the potential

Table 2 Time to diagnosis and treatment for patients with genital *Chlamydia trachomatis* infection

| | Number (%) | | |
	Text group (n = 28)	Standard group (n = 21)	p Value
Gender female	27 (96.4)	20 (95.2)	0.835
Race			
White British	11 (39.3)	6 (28.6)	
White other	5 (17.9)	5 (23.8)	
Black British	4 (14.3)	4 (19.0)	
Black other	4 (14.3)	1 (4.8)	
Other	3 (10.7)	5 (23.8)	
Not known	1 (3.6)	0 (0.0)	
Mean age, years (SD)	24.8 [3.9]	27.2 [8.6]	0.227*
Mean time to diagnosis, days (SD) (range)	7.9 (3.6) (4–23)	12.5 (4.5) (6–20)	<0.001*
Median time from contact to treatment, days (range)	1 (IQR 0–3) (0–20)	1 (0 to 2) (0–15)	0.756†
Median time from test to treatment, days (range)	9 (IQR 7–14) (4–27)	15 (9 to 18) (7–35)	0.005†

SD, standard deviation ;IQR, interquartile range.
*p Value using unpaired *t* test.
†p Value using Mann-Whitney U test.

benefits, if the majority of patients use the text message service there is a case for making it the default results service.

This utilisation of relatively new technology has enhanced our ability to communicate with our patients. The majority of our patients own a mobile phone. If, however, a patient does not have a mobile phone then they are able to return to or telephone a clinic less encumbered by traditional methods of results provision. Some patient groups, which may be both more at risk of STI and more receptive to the use of mobile phone technology, include young people, migrants and refugees, and those from poorer socioeconomic groups (with increasing ownership of mobile phones in preference to conventional land lines). The text message results service facilitates the communication of relevant information to patients in a timely manner having a positive impact on individual and public health. The introduction of this service has resulted in improved patient care and a significant saving in staff time.

CONTRIBUTORS
FMcN sent the text messages, and collected data on patient response times; ASM-J and AS initiated the text message result service in the John Hunter Clinic, analysed the data, and wrote the manuscript; SM assisted in the design and provided statistical analysis of these results; all authors reviewed the paper and gave final approval of this version.

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REFERENCES
1 **Menon-Johansson AS**, Kingston A, Sullivan AK. Putting sexual health in context. British Association of Sexual Health and HIV, Prize winning Junior Doctor presentation, Royal Society of Medicine, 21 February, 2004.
2 **Menon-Johansson AS**, Hawkins DA, Mandalia S, *et al*. Failure to maintain patient access to GUM clinics. *Sex Transm Infect* 2004;**80**:76–7.
3 **Griffiths V**, Ahmed-Jushuf I, Cassell JA. Understanding access to genitourinary medicine services. *Int J STD AIDS* 2004;**15**:587–9.
4 **Aral SA**, Roegner R. Mathematical modelling as a tool in STD prevention and control. *Sex Transm Dis* 2000;**27**:556–7.
5 **Short Message Service**. Wikipedia—the free encyclopaedia. (en.wikipedia. org/wiki/Text_message).
6 **Neville R**, Greene A, McLeod J, *et al*. Mobile phone text messaging can help young people manage asthma. *BMJ* 2002;**325**:600.
7 **Vilella A**, Bayas JM, Diaz MT, *et al*. The role of mobile phones in improving vaccination rates in travellers. *Prev Med* 2004;**38**:503–9.
8 **'Safer sex' Text messaging service**. BBC News 10 November 2004. (www.informatics.nhs.uk/cgi-bin/item.cgi?id=985).
9 **Foo C**, Browne R, Boag F. Retrospective review of the correlation of symptoms, signs and microscopy with the diagnosis of Chlamydia trachomatis in men. *Int J STD AIDS* 2004;**15**:319–21.